Background

Pregnancy is a period of increased calcium demand for fetal skeletal growth and profound changes in calcium metabolism and bone mineral density accompany human pregnancy both during pregnancy and after delivery. During pregnancy, mineral metabolism in the mother must adapt to the demand created by the fetus and the placenta, which together draw calcium and other minerals from the mother to mineralize the developing fetal skeleton. About 25-30g of calcium is transferred to a full-term neonate during pregnancy. The major theoretical processes of adaptation during pregnancy may be increased absorption of calcium from the intestine, mobilization of mineral from the maternal skeleton and increased rate of bone turnover to meet fetal calcium needs while preserving maternal homeostasis. Bone turnover during pregnancy has been demonstrated to be highly activated due to increased bone resorption preceding bone formation. Previously we have reported changes in biochemical markers of bone turnover and BMD in singleton pregnancy.

In twin pregnancy, calcium and bone metabolism may be greatly influenced because of growing twin fetuses. However, to the best of our knowledge, the influence of twin pregnancy on calcium metabolism and bone turnover during pregnancy and postpartum is not fully elucidated. The objective of this study was to examine the influence of twin pregnancy on markers of bone turnover and BMD by comparing between twin and singleton pregnancy during pregnancy.

Study Design & Methods

- Subjects
  - 48 healthy twin pregnant women and 41 singleton pregnant women during pregnancy (1st, 2nd, 3rd trimester)
- Exclusion criteria
  - Obstetric complications (preeclampsia, gestational diabetes mellitus, preterm labor), medical history (metabolic disease, diabetes mellitus, hyper or hypothyroidism, taking any medications known to interfere with bone metabolism), diagnosed major fetal anomaly

- Measurement of Biochemical markers of bone turnover
  - Bone resorption (β-Crosslaps) and bone formation (total alkaline phosphatase (ALP), osteocalcin (OC)), total calcium, phosphorus and parathyroid hormone

- Measurement of BMD
  - Calcaneous bone using Achilles Express™ Ultrasound Bone Densitometer (Lunar Corp., Madison, WI)

Results

<table>
<thead>
<tr>
<th></th>
<th>1st trimester</th>
<th>2nd trimester</th>
<th>3rd trimester</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMD (g/cm²) Twin</td>
<td>-1.18±1.47</td>
<td>-1.71±1.42</td>
<td>-1.94±1.38</td>
<td>0.308</td>
</tr>
<tr>
<td>Singleton</td>
<td>-0.86±0.79</td>
<td>-1.15±0.84</td>
<td>-1.41±0.81</td>
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</tbody>
</table>

Conclusions

Changes in bone metabolism in women with twin pregnancy seems to be different from singleton pregnancies. We found bigger and longer loss of BMD associated with acceleration of bone turnover in twin pregnancy in Korean women. Early and large increases in bone turnover markers signified higher fetal demand for calcium in twin pregnancy compared to singleton pregnancy. Therefore, higher levels of vitamin D and calcium suppletions are recommended during pregnancy in twin pregnancy.

However, further prospective studies with a larger number of subjects are necessary to gain a better understanding of the dynamics of bone metabolism during pregnancy in twin pregnancy.